IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Youri MARTYNOV, Johannes Willem Herman SILLEVIS SMITT, Gibbo Johannes ABRAHAMSE, Wilhelmus Adrianus Gerardus TIMMERS
Assignee:	Philips Lumileds Lighting Company, LLC (reassigned)
Title:	Illumination System and Display Device
Serial No.:	10/810,169
Filing Date:	March 25, 2004
Examiner:	Mark Tsidulko
Group Art Unit:	2875
Docket No.:	LUM-PHNL030367

Mail Stop Amendment
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

DECLARATION BY INVENTOR UNDER 37 CFR 1.132

1. I, Youri Martynov, am one of the co-inventors in the above-identified application.

2. In the Office Action dated September 14, 2006, the examiner stated the following on page 6: "Applicant has not provided evidence of unexpected results using a non-symmetrical arrangement [of LEDs]. Providing an affidavit under 37 CFR 1.132 would provide this evidence." This declaration is the affidavit providing such evidence.

3. The examiner rejected independent Claims 1 and 12 as being anticipated by Hoelon, publication US 2002/0167016. I am personally familiar with the Hoelon LED displays since the inventors named in the Hoelen publication and I work in the same LED group for Philips. My invention is an improvement of the Hoelen LED arrangements.

Patent Law Group LLP
2635 North First St.
Suite 223
San Jose, CA 95134
(408) 382-0480
FAX (408) 382-0481

4. In the current Office Action dated September 14, 2006, the examiner points to Hoelen's Fig. 2B as showing three different colors (BGB) of LEDs in a group. The group is a predetermined symmetrical pattern of GBRRBG. The examiner also relies on other patterns in Hoelen that are predetermined symmetrical patterns.

5. My present invention of independent Claims 1 and 12 is directed to a **non-symmetrical** LED pattern where the LEDs are arranged in a special **non-predetermined** pattern. The pattern is created based on an iterative process (summarized below) that creates optimal patterns, more accurately achieves a target white point, and provides surprisingly uniform color due to the iterative process. An important aspect of the invention is that the desired white point can be obtained without any compromise between using a repeated predetermined pattern of LEDs and achieving the desired white point. In contrast, the Hoelen arrangements of LEDs are simple predetermined symmetrical patterns that are not created using an iterative process. Hoelen is locked into using a whole number of his repeated patterns of LEDs or else he will have color non-uniformity when a fraction of a pattern is used, such as at the end of a row of LEDs. As a result, the Hoelen arrangements can not be applied to light sources where a total number of LED positions (N) is not equal to an integer multiple of LEDs in Hoelen's symmetrical group of LEDs.

6. One example of the iterative arrangement in the independent Claims 1 and 12 is summarized below.

7. Fig. 2 illustrates one example of the invention, where the set of light emitters (e.g., LEDs) is the highlighted 17 emitters, which is not a symmetrical pattern. The sequence of these 17 LEDs in Fig. 2 is GBRGGBGGRBGGBGRBG. The subsets are red (3 reds), blue (5 blues), and green (9 greens). The relative numbers of light emitters are selected based on the desired overall color point (e.g., color temperature) of the illuminator. For a display backlight, the color point will typically be a white point.

8. Since there are only three red emitters in the set of Fig. 2, those three red emitters are first positioned at substantially equal distances. In Fig. 2, the red emitters are

Patent Law Group LLP
2635 North First St.
Suite 223
San Jose, CA 95134
(408) 382-0480
FAX (408) 382-0481

separated by five positions. Since the reds are the fewest, it is most important that they be separated as widely as possible for color uniformity.

9. The next fewest number of emitters in the set of Fig. 2 is blue, with five emitters. The blue emitters are positioned at substantially equal distances in the unoccupied positions. In Fig. 2, the blue emitters are separated by two or three positions.

10. The next fewest number of emitters in the set of Fig. 2 is green, with nine emitters. The green emitters then fill the unoccupied positions, which is as equidistant as possible given the available positions.

11. The resulting arrangement is formed without symmetrical patterns of colors so that the resulting white point (or other combined color) can be achieved without the restriction of forming symmetrical patterns, and the combined color is substantially uniform color across the illuminator.

12. The iterative process, resulting in the non-symmetrical arrangement of LEDs, produced unexpected and surprising results, since good color uniformity was achieved in light sources with any number of LED positions and did not require LEDs to be arranged in an integer number of regular patterns. Such a color uniformity in a light source with so few design restrictions was unexpected and surprising. Additionally, the desired white point is more accurately achieved using my invention over the Hoelen predetermined patterns, since I can select any number of red, green, and blue LEDs to achieve the white point without regard to trying to create the white point with predetermined groups of LEDs.

13. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made may jeopardize the validity of the Application or any patent issued thereon.

November 25, 2006

Youri Martynov

Date

Patent Law Group LLP
2635 North First St.
Suite 223
San Jose, CA 95134
(408) 382-0480
FAX (408) 382-0481